

WHAT IS CLAIMED IS:

1. A method for manufacturing multi-wall carbon nanotubes comprising:
  - a process for preparing fullerene/carbon nanotube hybrid structures wherein assembled fullerenes, these being fullerenes that are linked, are housed within carbon nanotubes, and
  - a process whereby the hybrid structures are subjected to electron beam irradiation while in a heated state, thereby forming interior tubes from the assembled fullerenes.
2. A method as set forth in Claim 1, wherein the assembled fullerenes are essentially composed of C<sub>60</sub> fullerenes.
3. A method as set forth in Claim 1, wherein the carbon nanotubes forming part of the hybrid structures are essentially single-wall carbon nanotubes.
4. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams while in a state of being heated to 80 ~ 700°C.
5. A method as set forth in Claim 4, wherein the hybrid structures are subjected to irradiation with the electron beams while in a state of being heated to 100 ~ 500°C.
6. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams having an accelerating voltage of 80 ~ 250 kV.
7. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams at 100 ~ 500 C/cm<sup>2</sup>/min.
8. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams at an electron beam density of 1 ~ 8 × 10<sup>-11</sup> A /cm<sup>2</sup>.
9. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams for 15 minutes or less.

10. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams while in a state of being heated to 70 ~ 250°C.
11. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams having an accelerating voltage of 80 ~ 150 kV.
12. A method as set forth in Claim 1, wherein the hybrid structures are subjected to irradiation with the electron beams at an electron beam density of  $0.5 \sim 5 \times 10^{-11} \text{ A/cm}^2$ .
13. A method as set forth in Claim 1, wherein the hybrid structures are maintained in the heated state for a specified period before irradiation with the electron beams begins.
14. A method as set forth in Claim 1, wherein, after the irradiation of the hybrid structures with the electron beams has finished, resulting products thereof are maintained for a specified period within the same temperature range as during irradiation.
15. A method as set forth in Claim 1, wherein a process for preparing the hybrid structures includes a treatment whereby the fullerenes and the carbon nanotubes having an opening therein are brought together, and the fullerenes are filled into the carbon nanotubes.
16. Multi-wall carbon nanotubes manufactured by means of the manufacturing method of Claim 1.
17. Multi-wall carbon nanotubes comprising:
  - single-wall carbon nanotubes that form exterior tubes, and
  - single-wall carbon nanotubes that form interior tubes housed within the exterior tubes, the diameter of the interior tubes being approximately 0.3 ~ 0.4 nm.
18. Multi-wall carbon nanotubes comprising:
  - single-wall carbon nanotubes that form exterior tubes, and

single-wall carbon nanotubes that form interior tubes housed within the exterior tubes,  
a plurality of the interior tubes being housed in series.

19. Multi-wall carbon nanotubes as set forth in Claim 18, the average length of the interior tubes thereof being 1 ~ 5 nm.